

Key

## Ch. 9 Review Problems

1. The following table shows the number of reported crimes committed last year in the inner part of a large city. The crimes were classified according to type of crime and district of the inner city where it occurred. Do these data show sufficient evidence to reject the hypothesis that the type of crime and the district in which it occurred are independent? Use  $\alpha=0.01$ .

District	Robbery	Assault	Burglary	Larceny	Stolen Vehicle
1	54	331	227	1090	41
2	42	274	220	488	71
3	50	306	206	422	83
4	48	184	148	480	42
5	31	102	94	596	56
6	10	53	92	236	45

$H_0$ : district and type of crime are independent.

$H_a$ : district + type of crime are dependent.

$$\chi^2 = \sum \frac{(obs - exp)^2}{exp} = \frac{(54 - 66.907)^2}{66.907} + \frac{(331 - 355.89)^2}{355.89} + \dots = 337.66$$

$$P(\chi^2 > 337.66 | df = 20) = 1.54 \times 10^{-59}$$

- reject

- recopy  $H_a$ .

2. A grocery store manager wishes to determine whether a certain product will sell equally well in any of five locations the store. Five displays are set up, and the resulting numbers of the product sold are 43, 29, 52, 34, and 48. Is there enough evidence that the location makes a difference? Test at both the 5% and 10% significance levels.

$H_0$ : the observed freq. distrib. of grocery store displays fits the expected distrib.

$H_a$ : " " " " " " " " " " doesn't fit the expected distrib.

$$\chi^2 = \sum \frac{(obs - exp)^2}{exp} = \frac{(43 - 41.2)^2}{41.2} + \frac{(29 - 41.2)^2}{41.2} + \dots = 8.903$$

$$P(\chi^2 > 8.903 | df = 4) = 0.0636$$

@ 5%  $\Rightarrow$  fail to reject  $H_0$

@ 10%  $\Rightarrow$  reject  $H_0$

